

# Effect of Smoking on Uric Acid Level

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**Abstract: Objectives:** The study aimed to estimate plasma uric acid levels in Sudanese smokers. **Methodology:** 100 blood samples were collected into heparinized containers (3 ml) from smoker's cigarettes (50) and nonsmoker (50) as control group. Plasma was separated by centrifugation and plasma uric acid levels were estimated by enzymatic method using spectrophotometer. Data were analyzed statistically by Package for Social Sciences (SPSS) program. **Results:** mean of plasma uric acid levels was 5.452 for non smoker, 5.060 for smoker and p value < 0.044 for significant for smoker and non smoker. **Conclusion:** The study concluded that the level of uric acid in plasma was lower in smokers compared to non-smokers.

**Keywords:** Smoking, Free radicals, Antioxidants, uric acid.

## INTRODUCTION

Cigarette smoking is recognized as harmful and toxic to human system as each cigarette tears away 7-11 minutes of human life<sup>1</sup>. Through vascular endothelial damage<sup>2</sup> that possibly occurs through oxygen free radicals production as superoxide radicals, hydrogen peroxide and hydroxyl radicals.<sup>3,4</sup> Many enzymes producing oxygen free radicals including xanthine oxidase, myeloperoxidase, NADPH oxidase and endotoxin.<sup>3,4</sup> As cigarette smoke contains superoxide and reactive nitrogen species that readily react with various biomolecules,<sup>5,6</sup> it has been hypothesized that some of the harmful effects of oxidative smoking may lead to destroyed the endothelial cells, which results in nitric oxide (NO) shortage.<sup>7,8</sup> (NO) shortage regulates vascular tone that accelerates insufficiency of coronary artery and vasoconstriction in many different tissues.<sup>9</sup> Therefore high amount of oxidants versus antioxidants may lead to the smoker is susceptible.<sup>10,11</sup> In other hand the cigarette smokers have increased inflammatory responses that enhance their oxidative stress.<sup>8,9</sup> Since in humans, uric acid is the most abundant aqueous antioxidant, accounting for up to 60% of serum free radical scavenging capacity<sup>12</sup> and is an important intracellular free radical scavenger during metabolic stress including smoking,<sup>13,14</sup> therefore, measurement of its serum level reflects the antioxidant capacity<sup>12</sup>. The aim of this study is to demonstrate the possible effect of smoking on serum uric acid concentration.

## SUBJECTS AND METHOD

This comparative cross sectional study was done in Wad Madani town. Gazira state, Sudan. A total of 100 male-in different ages were selected. They were divided in two groups: Group 1 (controls-50) and Group 2 (smokers -50). Subjects included in group 1(controls) were males in different ages who had not smoking Subjects included in group 2 (smokers) were males in different ages who had smoking. Subjects with disease that can affect on uric acid level as (cancer - gout - renal disease).were excluded. Samples of venous blood were taken randomly, 3 ml collected in heparinized containers for each subject in both groups, centrifuged at 1500 rpm for 5 minutes. A plasma uric acid level was measured by enzymatic colorimetric method.

## STATISTICAL METHOD

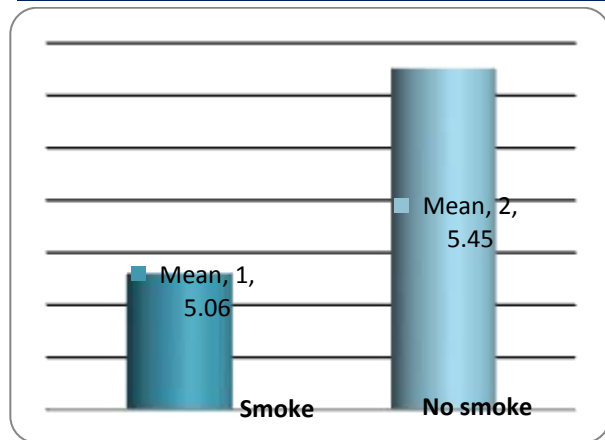
Different variables presented as mean  $\pm$  SD. We used SPSS program and T-test for the analysis of variance between two groups. The P value less than 0.05 were considered significant.

## RESULTS

For subjects in group 1 (control) and group 2 (smokers) the mean  $\pm$  SD concentration of plasma uric acid was 5.45 $\pm$ 0.91 mg/dl and 5.06 $\pm$ 1.0 mg/dl, respectively, The mean  $\pm$  SD concentration of plasma uric acid was significantly (p<0.044) decreased in group 2 as compared to group 1.

**Table 1:** Comparison between smokers and nonsmokers on serum uric acid level:

Variable	N	Minimum	Maximum	Mean	SD	p. value
Smoke	50	3.2	7.1	5.06	1.00	0.044
Non smoke	50	3.2	7	5.45	0.91	



**Figure 1:** compare the mean of serum uric acid level between the smoke and non smoke people.

### DISCUSSION

In our study included two groups: controls (nonsmokers) and smokers. There was a significant decreased in plasma uric acid in smokers as compared to control. As cigarette smoke contains superoxide and reactive nitrogen species that readily react with various biomolecules,<sup>15</sup> it has been hypothesized that some of the adverse effects of smoking may result from oxidative damage to endothelial cells Therefore imbalance between oxidants and antioxidants may play an important role in the susceptible smoker.<sup>16</sup> In addition cigarette smokers have increased inflammatory responses that further enhance their oxidative stress<sup>17</sup>. Since in humans, uric acid is the most abundant aqueous antioxidant, accounting for up to 60% of serum free radical scavenging capacity<sup>18</sup>. Many authors have observed decreased in plasma uric acid in smoker's Slater PE, et al also found a serum uric acid was lower in smokers than in non-smokers and in men ( $P = 0.003$ )<sup>19</sup>. In Bassam E. Hanna et al study In from March to June 2008, Serum uric acid was significantly lower in smokers<sup>20</sup>.

### CONCLUSION

The study concluded that the levels the levels of uric acid in plasma was lower in smokers compared to non-smokers.

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